



# NCERT



# CHAPTER WISE TOPIC WISE

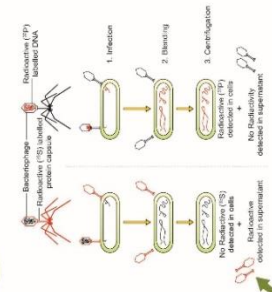
## LINE BY LINE QUESTIONS

## 2024



BY  
SCHOOL OF  
EDUCATORS

**SEMI-CONSERVATION MODEL**  
 Matthew Messelson and Franklin Stahl  
 Experimented on bacterium  
 Observed - DNA in chromosome replicated in a semi-conservative manner

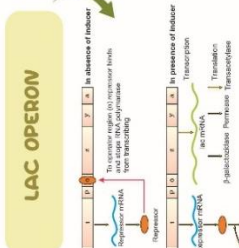


**Hershey - Chase Experiment**  
 Conducted experiment on Bacteriophage and bacteria  
 Observed - DNA is the genetic material

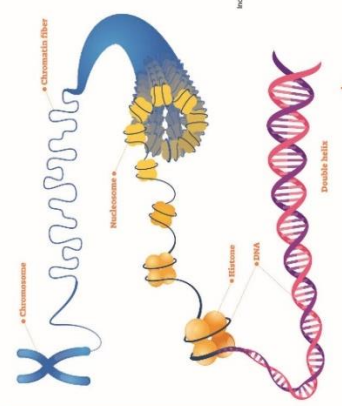
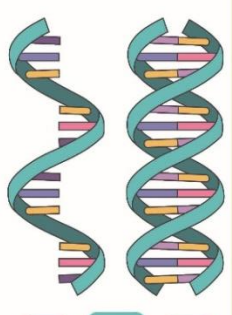
**BIOCHEMICAL NATURE OF PRINCIPLE**  
 Oswald Avery, Colin MacLeod and Maclyn McCarty  
 Observed that DNA is hereditary material not protein, RNA, etc.

**TRANSFORMING PRINCIPLE**  
 Frederick Griffith  
 Experimented on mice and Streptococcus pneumoniae

**SEARCH FOR GENETIC MATERIAL**



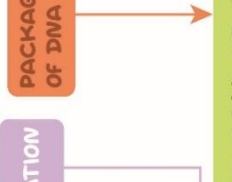
**REGULATION OF GENE EXPRESSION**



**STRUCTURE**  
 RNA  
 DNA

**PACKAGING OF DNA HELIX**

**REPLICATION**



**MOLECULAR BASIS OF INHERITANCE**

**HUMAN GENOME PROJECT (HGP)**  
 Conducted to identify all the estimated genes in human  
 To determine 3 billion chemical base pairs  
 Introduction to tools for data analysis and storage

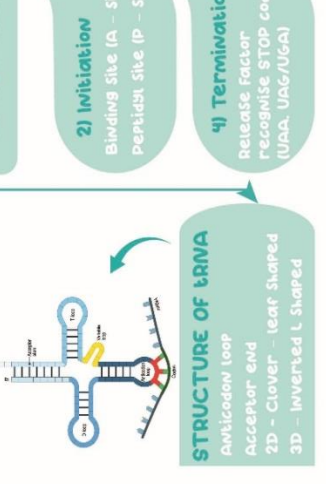
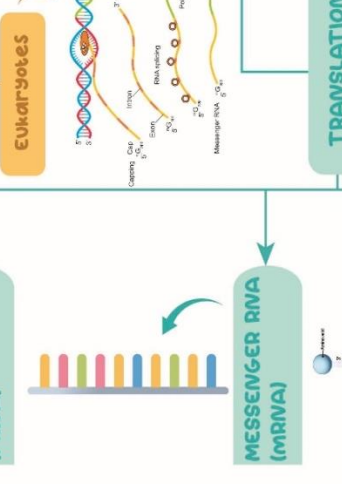
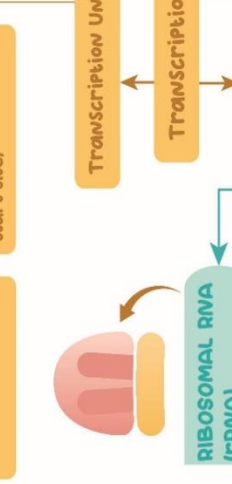
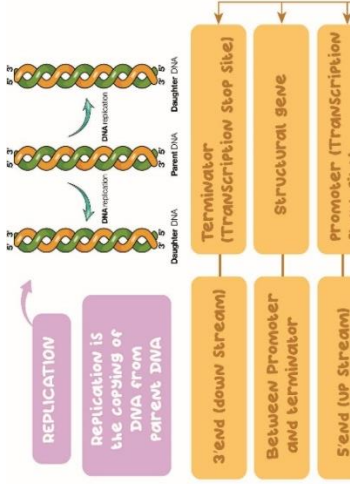
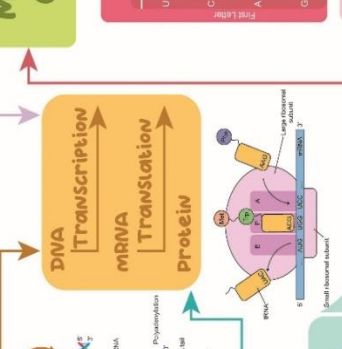
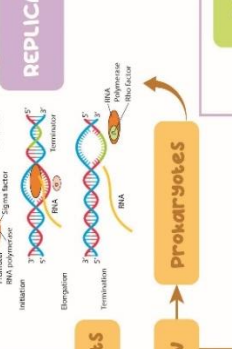
**Amino Acid Sequencing Chart**

First Letter	Second Letter	Third Letter
U	U	C
U	U	G
U	C	A
U	C	G
U	A	A
U	A	G
U	G	A
U	G	G
C	U	A
C	U	G
C	A	A
C	A	G
C	G	A
C	G	G
A	U	A
A	U	G
A	C	A
A	C	G
A	A	A
A	A	G
A	G	A
A	G	G

**MUTATION**  
 Point mutation  
 Deletion or frame shift mutation

**GENETIC CODE**  
 Salient features  
 Triplet in nature  
 Codons degenerate  
 Unambiguous in nature  
 Initiator codon (AUG)  
 Stop/ Terminator codons (UAA, UAG, UGA)

**DNA dependent DNA polymerase**  
 Initiates DNA Synthesis  
 Aids the formation of primers  
 Joins fragments of lagging strand  
 To unwind DNA helix  
 Relieve stress on DNA due to unwinding  
 DNA ligase  
 Helicase  
 Topoisomerases



## NCERT LINE BY LINE QUESTIONS

1. Monomer of nucleic acids are –  
 A) Peptides                      B) Nucleosides                      C) Ribonucleosides                      D) None of these
2. DNA and RNA are types of –  
 A) Nucleotides                      B) Nucleosides                      C) Nucleic acids                      D) Nucleamides

### Paragraph 6.1

#### The DNA

3. Length of DNA is usually defined as-  
 A) Number of nucleotides present in it  
 B) Number of pair of nucleotides present in it  
 C) Number of base pairs present in it  
 D) All of these
4. Match the length of DNA with the correct organisms –

A	B
I) $\Phi \times 174$	1) $4.6 \times 10^6$ bp (base pairs)
II) Bacteriophage $\gamma$	2) $3.3 \times 10^9$ bp
III) E. coli	3) 48502 bp
IV) Human DNA (haploid)	4) 5386 nucleotides

I	II	III	IV
A) 4	3	1	2
B) 3	4	2	1
C) 4	3	2	1
D) 3	4	1	2

### Paragraph 6.1.1

#### Structure of polynucleotides chain

5. A nucleotides contains –  
 A) Hexose sugar + nitrogenous base + phosphate group  
 B) Pentose sugar + nitrogenous base + phosphate group  
 C) Hexose sugar + nitrogenous base + sulphate group  
 D) Pentose sugar + nitrogenous base + sulphate group
6. Which of these is a purine –  
 A) Cytosine  
 B) Adenine  
 C) Thiamine  
 D) More than one is correct
7. Which of these is a pyrimidine –  
 A) Adenine      B) Thymine                      C) Guanine                      D) None of these
8. Which of these is a correct combination for a DNA nucleotides  
 A) Oxyribose + Phosphate + Uracil  
 B) Oxyribose + Phosphate + Thymine  
 C) Deoxyribose + Phosphate + Uracil  
 D) Deoxyribose + Phosphate + Thymine
9. All the given nucleotides exists, except  
 A) Deoxy uridine      B) Thymine      C) Both A & B                      D) None of these
10. Nitrogenous base is linked to which carbon of pentose sugar  
 A) 1'C                      B) 2'C                      C) 3'C                      D) 5'C
11. Nitrogenous base is linked to pentose sugar by which bond –

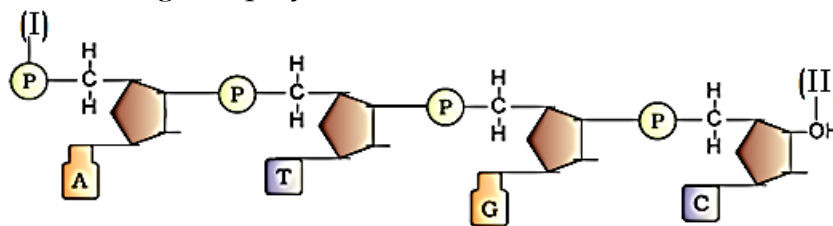


- A) N - Glycosidic bond                      B) Phosphoester bond  
C) Phosphodiester bond                    D) Peptide bond

12. Phosphate group is linked to which carbon of pentose sugar

- A) 1'C    B) 2'C    C) 3'C    D) 5'C

13. Identify the free ends of given polynucleotides chain -



I

II

- |                 |              |
|-----------------|--------------|
| A) 3' phosphate | 5' hydroxyl  |
| B) 5' hydroxyl  | 3' phosphate |
| C) 5' phosphate | 3' hydroxyl  |
| D) 3' hydroxyl  | 5' phosphate |

14. Backbone of polynucleotide chain is formed due to -

- A) Sugar and N-base  
B) Sugar and phosphate  
C) Phosphate and N - Base  
D) All of these

15. Which is correct about thymine & uracil -

- A) Uracil is 5-methyl thymine  
B) Thymine is 5-methyl uracil  
C) Uracil is 5-ethyl thymine  
D) Thymine in 5-ethyl uracil

16. DNA is -

- A) Acidic and positively charged  
B) Basic and positively charged  
C) Acidic and negatively charged  
D) Basic and negatively charged

17. Name of DNA as 'Nuclein' was given by -

- |                       |                      |
|-----------------------|----------------------|
| A) Francis crick      | B) Erwin Chargaff    |
| C) Friedrich Meischer | D) Rosalind Franklin |

18. Double Helix for structure of DNA model was proposed by -

- A) Wilkins and Franklin based on their Xray diffraction date  
B) Watson and Crick based on their X-ray diffraction date  
C) Chargaff based on their X-ray diffraction data  
D) None of these

19. The proposition of base pairing between the two stands of polynucleotide chain in double Helix model of DNA was based on observation of -

- |                    |                      |
|--------------------|----------------------|
| A) Maurice Wilkins | B) Rosalind Franklin |
| C) Erwin Chargaff  | D) Both A & B        |

20. The two chains of double Helix DNA have -

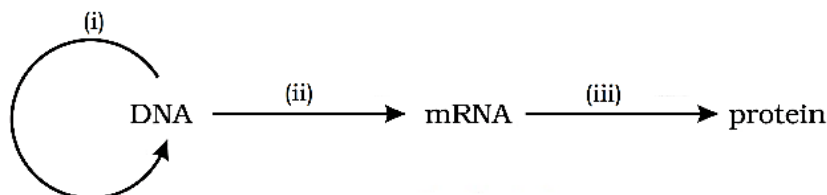
- |                      |                           |
|----------------------|---------------------------|
| A) Parallel polarity | B) Anti-parallel polarity |
| C) No polarity       | D) Depends on organism    |

21. The bases in two stands of DNA are paired through

- |                    |                 |
|--------------------|-----------------|
| A) Hydrogen bond   | B) Peptide bond |
| C) Glycosidic bond | D) Sulfide bond |

22. Which of the following is true about base pairing in DNA -

- A) Adenine forms two hydrogen bond with Guanine  
 B) Adenine forms three hydrogen bond with Guanine  
 C) Adenine forms two hydrogen bond with Thymine  
 D) Adenine forms three hydrogen bond with Thymine
23. Which of the following is true about base pairing in DNA –  
 A) Guanine forms two H-bond with Cytosine  
 B) Guanine forms three H-bond with Cytosine  
 C) Guanine forms two H-bond with Adenine  
 D) Guanine forms three H-bond with Adenine
24. Uniform distance between two stands of Helix is due to –  
 A) Double and triple bond formed between base pairs  
 B) Sugar – phosphate backbone  
 C) Purine – pyrimidine base pairing  
 D) None of these
25. How many of the following statements about Double – helix structure of DNA is correct –  
 i) Two chains are coiled in right – handed fashion  
 ii) Pitch of helix is 3.6 nm  
 iii) There are roughly 10 bp in each turn  
 iv) Plane of one base pair stacks over the other  
 A) 1                      B) 2                      C) 3                      D) 4
26. Pitch of helix in double helix DNA is –  
 A) 3.6 nm              B) 3.4 nm              C) 3.2 nm              D) 3.8 nm
27. Central dogma in molecular biology was proposed by --  
 A) Crick              B) Watson              C) F. Meischar              D) Chragaff
28. Identify correct labels --

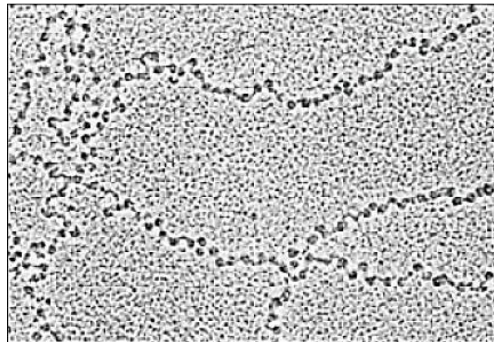


- | (i)              | (ii)          | (iii)         |
|------------------|---------------|---------------|
| A) Replication   | Translation   | Transcription |
| B) Replication   | Transcription | Translation   |
| C) Transcription | Replication   | Translation   |
| D) Translation   | Replication   | Transcription |

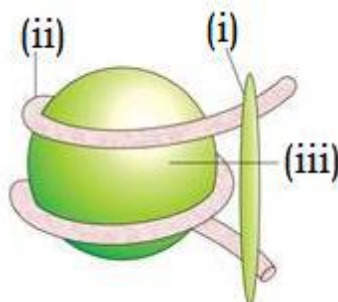
### Paragraph 6.1.2 Packaging of DNA Helix

29. If length of E. coli DNA is 1.36 mm, calculate number of base pair in E. coli? Given – distance between consecutive base pairs is  $0.34 \times 10^{-9}$  m. –  
 A)  $4 \times 10^6$               B)  $4 \times 10^9$               C)  $4 \times 10^{-6}$               D)  $4 \times 10^{12}$
30. **Assertion** : In E. coli, DNA is scattered throughout the cell  
**Reason** : In E. coli, there is no defined nucleus  
 A) Both Assertion & Reason are correct & Reason is correct explanation for Assertion  
 B) Both Assertion & Reason are correct but Reason is not correct explanation for Assertion  
 C) Assertion is correct and Reason is incorrect  
 D) Reason is correct and Assertion is incorrect
31. Histones are –  
 A) Positive and acidic in eukaryotes  
 B) Positive and acidic in prokaryotes

- C) Positive and basic in eukaryotes  
D) Positive and basic in prokaryotes
32. Assertion - Histones are positively charged Reason - Histones are rich in basic amino acid residues lysine and arginine  
A) Assertion & Reason are correct and Reason is correct explanation for Assertion  
B) Assertion & Reason are correct and Reason is not the correct explanation for Assertion  
C) Assertion is correct and Reason is wrong  
D) Both Assertion and Reason are wrong
33. Histones are organized into-  
A) Hexamer B) Octamer C) Tetramer D) Dimer
34. A typical nucleosome contain \_\_\_\_\_ bp of DNA has  
A) 200 B) 400 C) 600 D) 800
35. Repeating unit of chromatin -  
A) Are nucleosomes  
B) Are seen as 'beads-on-string' under electron microscope  
C) Are packed to form fibres  
D) All of these
36. The figure show -



- A) Beads-on-string  
B) A nucleosome  
C) Chromatin  
D) More than one option is correct
37. Identify the correct label for given figure



- | (i)           | (ii)            | (iii)           |
|---------------|-----------------|-----------------|
| A) H2 histone | DNA             | Histone octamer |
| B) H1 histone | Histone octamer | DNA             |
| C) H2 histone | Histon octamer  | DNA             |
| D) H1 histone | DNA             | Histone octamer |
38. Chromosomes are connected chromatin fibres present -  
A) At all times in cell  
B) Only during cell division - formed at prophase  
C) Only during cell division - formed at metaphase  
D) Only during cell division - formed at Interphase

39. In a typical nucleus, euchromatin & hetero chromatin are present. Choose the correct set of characters for heterochromatin –
- i) Loosely packed                      ii) Densely packed  
 iii) Light stain                      iv) Dark stain  
 v) Inactive chromatin                      vi) Active chromatin
- A) i, iii, v                      B) ii, iv, vi                      C) i, iii, vi                      D) ii, iv, v
40. Choose correct set of characters for euchromatin
- i) Loosely packed                      ii) Densely packed  
 iii) Light stain                      iv) Dark stain  
 v) Inactive chromatin                      vi) Active chromatin
- A) i, iii, v                      B) ii, iv, vi                      C) i, iii, vi                      D) ii, iv, v

## 6.2 The Search for Genetic Material Transforming Principle

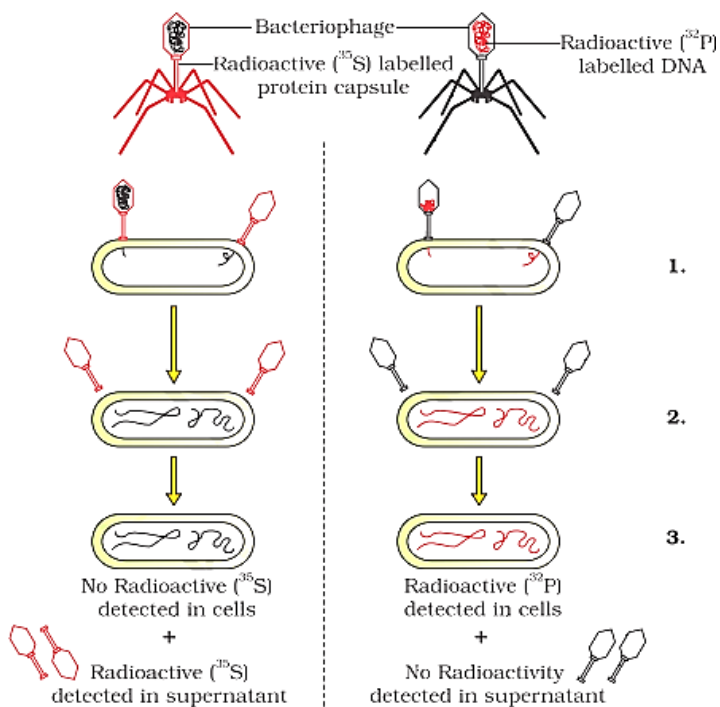
41. Griffith's experiments were conducted in-
- A) 1928                      B) 1958                      C) 1978                      D) 1968
42. The experiment of Griffith was performed in-
- A) Diplococcus pneumoniae, bacteria                      B) Haemophilus influenzae, fungi  
 C) Streptococcus pneumoniae, fungi                      D) None of these
43. Match the given columns-
- | I              | II                 | III                |
|----------------|--------------------|--------------------|
| i. R-strain    | (a) Smooth         | (1) Mucous coat    |
| ii. S-strain   | (b) Rough colonies | (2) No mucous coat |
| A) (i)-(a)-(1) | B) (i)-(b)-(1)     | C) (ii)-(a)-(1)    |
|                |                    | D) (ii)-(a)-(2)    |
44. Which strain of the microbe used Griffith is virulent-
- A) S-strain                      B) R-strain                      C) Both                      D) None
45. Griffith observed that the mice died surprisingly the following combination of strains was used, which was unusual-
- A) S-strain heat killed                      B) Heat killed S-strain  
 C) Heat killed R-strain + Live S-strain                      D) Heat killed S-strain + Live R-strain
46. In Griffith experiment
- A) R-strain transformed to S-strain and became virulent  
 B) R-strain transformed to S-strain and lost virulence  
 C) S-strain transformed to R-strain and became virulent  
 D) S-strain transformed to R-strain and lost virulence
47. Griffith claimed that-
- A) Some protein was transferred among bacteria  
 B) Some DNA was transferred among bacteria  
 C) Some carbohydrates was transferred among bacteria  
 D) None of these

## Biochemical Characterization of Transforming Principle

48. Prior to work of Avery, Macleod and McCarty, genetic material was thought to be-
- A) Protein                      B) DNA                      C) RNA                      D) None
49. Avery, Macleod & McCarty discovered that-
- A) DNA caused transformation  
 B) RNA caused transformation  
 C) Protein caused transformation  
 D) Lipid caused transformation
50. Which enzyme inhibited the transformation-
- A) Protease                      B) RNase                      C) DNase                      D) All

## 6.2.1 The Genetic Material is DNA

51. Unequivocal proof that DNA is genetic material came from experiments of-  
 A) Avery, Macleod & McCarty  
 B) Hershey and Chase  
 C) de Vries, Correns and Tschermak  
 D) Sutton and Boveri
52. The scientists of Q-11 worked with-  
 A) a virus B) a bacteria C) a fungi D) a nematode
53. In the experiment performed for proving DNA as genetic material, the bacteriophages were grown on medium containing-  
 A) radioactive sulfur B) radioactive nitrogen  
 C) radioactive phosphorous D) More than one option
54. The bacteriophages growing in presence of radioactive phosphorous \_\_ (i) \_\_ contained radioactive \_\_ (ii) \_\_.  
 (i) (ii)  
 A) P32 DNA  
 B) P35 Protein  
 C) P32 Protein  
 D) P35 DNA
55. Bacteriophages grown on radioactive Sulphur \_\_ (i) \_\_ contained radioactive \_\_ (ii) \_\_.  
 (i) (ii)  
 A) S32 DNA  
 B) S32 Protein  
 C) S35 DNA  
 D) P35 Protein
56. The bacteria involved in Hershey & chase experiment of 1952 was-  
 A) Bacteriophage B) E. coli  
 C) S. pneumoniae D) C. butyliwm
57. Bacteria infected with virus that showed radioactivity had-  
 A) radioactive DNA (S32) B) radioactive DNA (S35)  
 C) radioactive DNA (P32) D) radioactive DNA (P35)
- 58.



Identify the correct label.

- 1 2 3  
 A) Blending Infection Centrifugation



- |                   |                |                |
|-------------------|----------------|----------------|
| B) Infection      | Blending       | Centrifugation |
| C) Centrifugation | Infection      | Blending       |
| D) Blending       | Centrifugation | Infection      |

### 6.2.2 Properties of Genetic Material (DNA vs RNA)

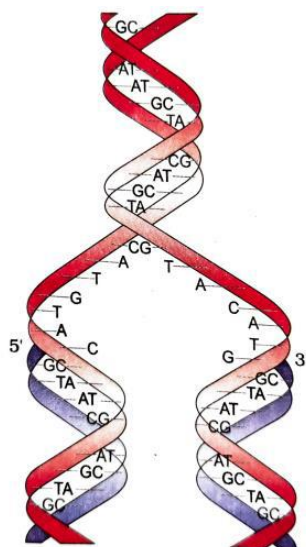
59. RNA is genetic material in-  
 A) TMV                      B) QB Bacteriophage                      C) Both A and B                      D) None of these
60. Properties of genetic material include-  
 A) Stable                      B) Mutable                      C) Replicable                      D) All of these
61. A - Stability as a property of genetic material was very evident in Griffith's transforming principle.  
 R-Heat can kill the bacteria and completely destroy the properties of genetic material  
 A) Both A and R are true and R is correct explanation for A  
 B) Both A and R are true but R is not correct explanation for R  
 C) A is true but R is false                      D) Both A and R are false
62. Which is more structurally and chemically stable?  
 A) DNA                      B) RNA                      C) Protein                      D) All
63. RNA viruses show-  
 A) Less mutation                      B) Faster evolution  
 C) Slower evolution                      D) More than one option is correct
64. DNA is preferred by nature over RNA for-  
 A) Storage of genetic information                      B) Transmission of genetic information  
 C) Expression of genetic information                      D) More than one

### 6.3 RNA World

65. Choose incorrect statement RNA-  
 A) was first genetic material                      B) acts as catalyst too  
 C) is more stable than DNA                      D) has protein synthesizing mechanism built around it

### 6.4 Replication

66. Scheme for replication of DNA was proposed by -  
 A) Watson & Crick                      B) Meselson & Stahl  
 C) Taylor                      D) Hershey & Chase
67. The replication of DNA is-  
 A) Conservative                      B) Non-conservative  
 C) Semi-conservative                      D) All of these depending on organism
- 68.

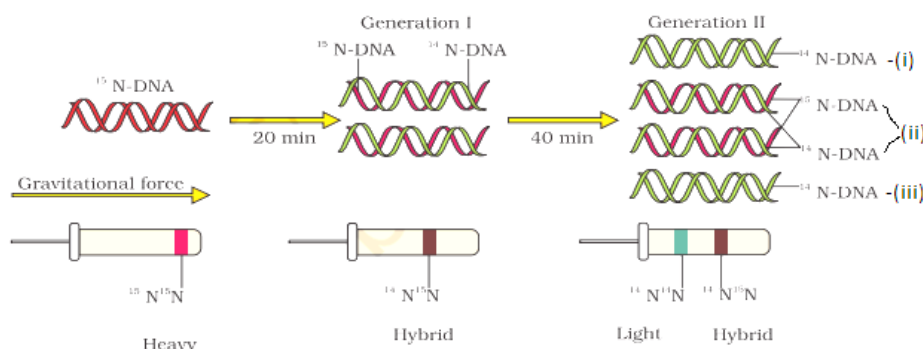


The figure shows-

- A) Conservative DNA replication model
- B) Semi-conservative DNA replication model
- C) Non-conservative DNA replication model
- D) Can't say

### 6.4.1 The Experimental Proof

69. The DNA replication model experimental proof was first shown in-
- A) Human cells      B) E. coli      C) Plant cell      D) Vicia faba
70. Meselson and Stahl performed experiment for proving DNA replication scheme in-
- A) 1952      B) 1953      C) 1958      D) 1961
71. The bacteria were grown in medium containing-
- A)  $^{15}\text{NH}_4\text{Cl}$  -  $^{15}\text{N}$  is heavy isotope of nitrogen
  - B)  $^{14}\text{NH}_4\text{Cl}$  -  $^{14}\text{N}$  is heavy isotope of nitrogen
  - C)  $^{15}\text{NH}_4\text{Cl}$  -  $^{15}\text{N}$  is normal isotope of nitrogen
  - D)  $^{14}\text{NH}_4\text{Cl}$  -  $^{14}\text{N}$  is normal isotope of nitrogen
72. The heavy DNA molecule containing heavy isotope of N is distinguished from normal DNA by-
- A) UV rays      B) Ethidium bromide solution
  - C) Centrifugation in CsCl density gradient      D) PCR technique
73. In Meselson & Stahl experiment, first they-
- A) grew bacteria on heavy isotope of N medium followed by normal one
  - B) grew bacteria on normal isotope of N medium followed by heavy one
  - C) grew bacteria on radioactive N followed by heavy one
  - D) grew bacteria on heavy isotope of N followed by radioactive one
74. Identify the correct label

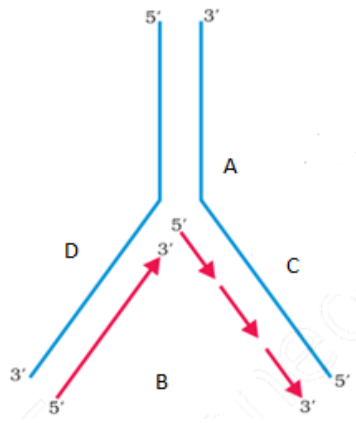


- |          |        |        |
|----------|--------|--------|
| (i)      | (ii)   | (iii)  |
| A) Light | Heavy  | Hybrid |
| B) Heavy | Hybrid | Light  |
| C) Light | Hybrid | Light  |
| D) Heavy | Hybrid | Heavy  |
75. In Meselson & Stahl expt a bacteria after dividing in 20 minutes had a hybrid DNA. What will be the ratio of Hybrid to Light after 80 minutes?
- A) 2 : 14      B) 14 : 2      C) 16 : 2      D) 2 : 16
76. Similar experiment on Vicia faba was conducted by \_\_\_\_ to detect distribution of newly synthesized DNA in chromosomes.
- A) Taylor      B) Stahl      C) Gamow      D) Nirenberg
77. Experiment on Vicia faba involved use of-
- A) Radioactive uridine      B) Radioactive thymidine
  - C) Radioactive adenosine      D) Radioactive cytidine

### 6.4.2 The Machinery and the Enzymes

78. The main enzyme of replication is-

- A) RNA dependent RNA polymerase  
 B) RNA dependent DNA polymerase  
 C) DNA dependent DNA polymerase  
 D) DNA dependent RNA polymerase
79. Choose correct statement with regard with efficiency of DNA polymerase.  
 A)  $4.6 \times 10^6$  bp of E. coli replicate within 46 minutes  
 B) The average rate of polymerization of DNA polymerase has to be approximately 2000 bp/minute  
 C) The polymerization accuracy is very high and very fast  
 D) All of these
80. What is function of deoxyribonucleoside triphosphate -  
 A) It act as substrate  
 B) Provide energy for polymerization  
 C) A and B both  
 D) It is product formed after polymerization
81. Assertion : The two strands of DNA cannot be separated in their length.  
 Reason : Separation required very high energy.  
 A) Both Assertion & Reason are correct and reason is correct explanation of assertion  
 B) Both Assertion & Reason are correct and reason is not correct explanation of assertion  
 C) Assertion is correct, Reason is false  
 D) Assertion & Reason are false
82. Polymerization by DNA polymerase is in-  
 A)  $3' \rightarrow 5'$  direction only  
 B)  $5' \rightarrow 3'$  direction only  
 C) A and B both  
 D) Random
83. The template of replication fork with polarity  $5' \rightarrow 3'$  is \_\_\_\_ while  $3' \rightarrow 5'$  is \_\_\_\_.  
 A) continuous, continuous  
 B) continuous, discontinuous  
 C) discontinuous, continuous  
 D) discontinuous, discontinuous
84. DNA ligase act on-  
 A)  $5' \rightarrow 3'$  template strand  
 B)  $3' \rightarrow 5'$  template strand  
 C) Both A and B  
 D) Ligate RNA with vector of  $3' \rightarrow 5'$  polarity
85. The replication in eukaryotes take place in-  
 A) M-phase                      B) G1 phase                      C) S-phase                      D) G2 phase
86. Polyploidy resulted by-  
 A) A failure in cell division after DNA replication  
 B) A failure in DNA replication after cell division  
 C) A failure in cell division before DNA replication  
 D) A and C both
87. Correct label of A, B, C, D is-



- (i) A = Template parental strand
- (ii) B = Newly synthesized strand
- (iii) D = Continuous strand
- (iv) C = Discontinuous strand

A) i, ii only      B) iii, iv only      C) i, ii, iii, iv      D) None of these

### 6.5 Transcription

88. Transcription is-
  - A) The process of copying genetic information from both strand of DNA into RNA
  - B) The process of copying genetic information from one strand of DNA into RNA
  - C) The process of copying genetic information from RNA into DNA
  - D) A and B both
89. In transcription, adenosine bind with
  - A) Thymine      B) Uracil      C) Cytosine      D) A and B both
90. Why both the strand of DNA are not copied during transcription-
  - A) If both strands act a template, they would code for RNA molecules with same sequence
  - B) RNA formed by transcription of both strand, when code for protein, the sequence of amino acid in protein are same
  - C) The two RNA molecules if produced simultaneously would be complementary to each other
  - D) All of these
91. Translation of RNA would be prevented if-
  - A) RNA is single strand
  - B) RNA is double-stranded
  - C) RNA is produced by both strand of DNA
  - D) B and C both

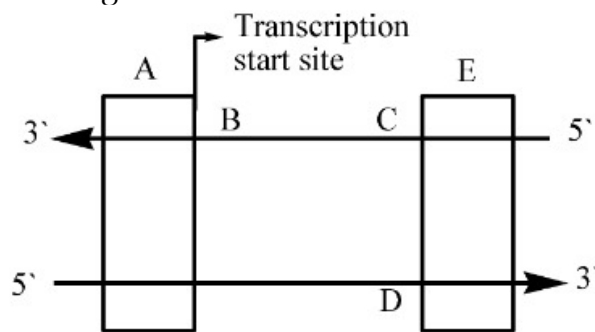
### 6.5.1 Transcription Unit

92. Transcription unit primarily consist of-
  - A) 1 region      B) 2 regions      C) 3 regions      D) None of these
93. Transcription primarily required-
  - A) RNA dependent RNA polymerase
  - B) DNA dependent RNA polymerase
  - C) DNA dependent DNA polymerase
  - D) RNA dependents DNA polymerase
94. Template strand of transcription unit is/are-
  - A) 5' → 3' strand of DNA
  - B) 3' → 5' strand of DNA
  - C) Site of catalysis of enzyme required for transcription
  - D) B and C both
95. What is coding strand of given template strand 3' - AGCATGCA - 5'
  - A) 5' - TACGTACGT - 3'



- B) 5' - UACGUACGU - 3'  
 C) 3' - UACGUACGU - 5'  
 D) 3' - TACGTACGT - 5'

96. Label A, B, C, D, E of given diagram.



	a	b	c	d	e
<b>A</b>	Promoter	Structural Gene	Template strand	Coding strand	Terminator
<b>B</b>	Terminator	Structural Gene	Coding strand	Template strand	Promoter
<b>C</b>	Promoter	Template strand	Coding strand	Structural Gene	Terminator
<b>D</b>	None of these				

97. Promoter is located-

- (i) 3' end  
 (ii) 5' end  
 (iii) upstream of structural gene  
 (iv) downstream of structural gene  
 A) i, iii                      B) ii, iii                      C) i, iv                      D) ii, iv

98. Terminator is located at

- (i) 3' end  
 (ii) 5' end  
 (iii) upstream of structural gene  
 (iv) downstream of structural gene  
 A) i, iii                      B) ii, iii                      C) i, iv                      D) ii, iv

### 6.5.2 Transcription unit and the gene

99. A gene is defined as-

- A) Functional unit of inheritance  
 B) Non-functional region of DNA that haven't any information  
 C) A and B both  
 D) None of these

100. Cistron is-

- A) Segment of DNA coding for a polypeptide  
 B) Segment of RNA coding for a polypeptide  
 C) Segment of DNA that are non-coding sequence  
 D) Segment of RNA have not any coding sequence

101. Choose the correct statement.

- A) Monocistronic eukaryotic structural gene have interrupted coding sequence.  
 B) Polycistronic prokaryotic structural gene have interrupted coding sequence.

- C) Monocistronic prokaryotic structural gene have interrupted coding sequence.  
 D) A and B both
102. Exons are-
- A) Coding sequence  
 B) Non-coding sequence  
 C) Expressed sequence  
 D) A and C both
103. Intron-
- A) appear in mature or processed RNA  
 B) do not appear in mature or processed RNA  
 C) appear in prokaryotes  
 D) B and C both

### 6.5.3 Types of RNA & Process of Transcription

104. Which of following play role in protein synthesis of prokaryote?
- A) r-RNA                      B) t-RNA  
 C) m-RNA                    D) All of these
105. The function of some RNA are given below choose the incorrect one.
- A) mRNA provide template strand  
 B) mRNA provide non-template strand  
 C) tRNA bring amino acid  
 D) rRNA play structural & catalytic role
106. How many polymerase required in bacteria for transcription of all type of RNA?
- A) One                      B) Two                      C) Three                      D) Five
107. Choose incorrect step about transcription.
- A) RNA polymerase binds to promoter and initiate transcription.  
 B) Nucleotide triphosphate act as substrate and polymerization in a template.  
 C) A short stretch of RNA remains bound to enzyme.  
 D) Last step is termination.
108. Initiation factor and termination factor are-
- A) Sigma and Rho factor respectively.  
 B) Rho and Sigma factor respectively.  
 C) Rho and Rho factor respectively.  
 D) Sigma and Sigma factor respectively.
109. Translation & transcription in eukaryote occur in
- A) Cytoplasm & nucleus respectively  
 B) Nucleus & cytoplasm respectively  
 C) Cytosol  
 D) Nucleus
110. Which of following can be coupled in bacteria?
- A) Replication & transcription  
 B) Transcription & translation  
 C) Replication & translation  
 D) None of these
111. Transcription of 18 s rRNA is done by \_\_\_\_ in eukaryote.
- A) RNA pol. I                      B) RNA pol. II                      C) RNA pol. III                      D) All of these
112. Choose incorrect statement.
- A) 5.8 s r-RNA and 5 s-RNA transcribed by same RNA polymerase in eukaryote.  
 B) hnRNA & mRNA transcribed by same RNA polymerase in eukaryote.  
 C) tRNA & snRNA transcribed by same RNA polymerase in eukaryote.  
 D) None of these

113. Splicing is required to-
- A) remove intron in eukaryote
  - B) remove exon in eukaryote
  - C) remove exon in prokaryote
  - D) remove intron in prokaryote
114. Capping is-
- A) Addition of methyl guanosine triphosphate at 5' end
  - B) addition of adenylate residue at 3' end
  - C) addition of methyl guanosine triphosphate at 3' end
  - D) addition of adenylate residue at 5' end
115. The fully processed hnRNA is-
- A) tRNA
  - B) mRNA
  - C) rRNA
  - D) None of these
116. George Gamow argued-
- A) There are only 5 bases and if they have code for 20 amino acid the code should constitute a combination of bases
  - B) There are only 4 bases and if they have code for 20 amino acid the code should constitute a combination of bases
  - C) Genetic code is triplet
  - D) B and C
117. Which of following have maximum codon in genetic code-
- A) Leu
  - B) Met
  - C) Cal
  - D) Phe
118. Which of following is/are showing dual function-
- A) UUU
  - B) AUG
  - C) UGA
  - D) GUA
119. Least number of codon is for-
- A) Met
  - B) Phe
  - C) Glu
  - D) Gly

## 6.6 Genetic Code

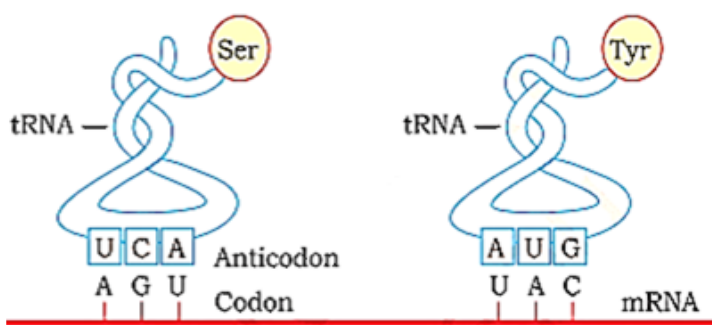
### 6.6.1 Mutations and Genetic Code

120. Sickle cell anaemia is classical example of-
- A) point mutation
  - B) frameshift mutation
  - C) deletion mutation
  - D) addition mutation
121. In sickle cell anaemia, there are changes in gene for-
- A) alpha globin chain
  - B) beta globin chain
  - C) gamma globin chain
  - D) delta globin chain
122. In sickle cell anaemia, resultant effect of mutation is change of amino acid residue-
- A) Valine to alanine
  - B) Valine to glutamic acid
  - C) Alanine to valine
  - D) Glutamic acid to valine
123. The following is an example of- BIG RED CAP  $\Rightarrow$  BIG REM DCA P
- A) Deletion mutation
  - B) Point mutation
  - C) Addition mutation
  - D) More than one option
124. RAM HAS CAP  $\Rightarrow$  RAM HAS BIG CAP
- The given example shows-
- A) Addition mutation

- B) Deletion mutation
- C) Substitution mutation
- D) More than one option

## 6.6.2 tRNA – the Adapter Molecule

125. tRNA has-
- A) Codon loop      B) Anticodon loop      C) Both      D) Neither
126. The presence of adapter molecule to read the code on DNA and bind to amino acids was postulated by-
- A) James Watson      B) Francis Crick      C) Friedrich Meisher      D) Both A and B
127. tRNA was also called-
- A) s RNA (soluble RNA)      B) s RNA (single RNA)
  - C) s RNA (smart RNA)      D) s RNA (simple RNA)
128. The amino acid acceptor end of tRNA is-
- A) 5'      B) 3'      C) Can be any of these      D) Free end
129. For initiation translation,
- A) Only tRNA carries initiator amino acid to the site.
  - B) Specific rRNA carries initiator amino acid to the site.
  - C) Any rRNA carries initiator amino acid to the site.
  - D) Specific tRNA carries initiator amino acid to the site.
130. For stop codon-
- A) There are specific tRNAs with amino acids.
  - B) There are specific tRNAs which do not bind to any amino acids.
  - C) There are no tRNA.
  - D) There are tRNAs which may or may not bind to amino acids.
131. The given figure shows-



- A) Secondary structure of tRNA – Cloverleaf
  - B) Primary structure of tRNA – clover-leaf
  - C) Secondary structure of tRNA –inverted-L
  - D) Primary structure of tRNA – inverted-L
- ## 6.7 TRANSLATION
132. Translation refers to process of-
- A) Making RNA from DNA
  - B) Making DNA from RNA
  - C) Polymerization of nucleotide to form a DNA
  - D) Polymerization of amino acid to form a polypeptide
133. The order and sequence of amino acid during translation are defined by-
- A) The sequences of bases in r-RNA
  - B) The sequences of bases in t-RNA
  - C) The sequences of bases in m-RNA
  - D) All of these
134. Which of following bond is formed during translation?



- A) Glycosidic bond  
B) Phosphodiester bond  
C) Peptide bond  
D) All of these
135. First phase of translation does not involve -  
A) Charging of RNA  
B) Amino acids are activated in presence of ATP  
C) Activated amino acid are linked to their cognate tRNA  
D) None of these
136. Initiation or first phase of translation is -  
A) Amino acylation of tRNA  
B) Amino acylation of mRNA  
C) Both A and B  
D) Deamino acylation of mRNA
137. The cellular factory responsible for synthesizing protein is-  
A) Ribosome B) Lysosome C) Peroxisome D) None of these
138. In inactive state, protein factory of cell exist in  
A) Two state B) 4 state in prokaryote  
C) 6 state in eukaryote D) B and C both
139. Which of following is sign as beginning of translation?  
A) When the large subunit of protein factory of cell encounters an mRNA.  
B) When the small subunit of protein factory of cell encounters an mRNA.  
C) When the small subunit of protein factory of cell encounter a tRNA.  
D) When the large subunit of protein factory of cell encounters a tRNA.
140. The bond formation (peptide) between charged tRNA is accomplished due to-  
A) Presence of ATP and catalyst  
B) Two such charged tRNA are brought close by two site in large subunit of ribosome  
C) Two charged tRNA are brought close by two site in small subunit of ribosome & presence of ATP along with catalyst  
D) A and B both
141. The ribosome act as catalyst during bond formation (peptide) as in-  
A) 28 s rRNA in bacteria B) 23 s rRNA in bacteria  
C) 23 s rRNA in eukaryote D) 28 s tRNA in bacteria
142. Choose the correct statement-  
A) A translational unit in mRNA is sequence of RNA that is flanked by start codon and stop codon and codes for polypeptide.  
B) A translational unit is sequence of DNA that is flanked by start codon & codes for polypeptide.  
C) A transcriptional unit in tRNA is the sequence of RNA that is flanked by start codon and stop codon and codes for polypeptide.  
D) A transcriptional unit in rRNA is the sequence of RNA that is flanked by start codon (AUG) and stop codon and codes for polypeptide.
143. UTR is/are -  
(i) Untranslated region of mRNA  
(ii) It present at both 5' end (start codon) and 3' end (before stop codon)  
(iii) They are required for efficient translation process  
(iv) It present at both 3' end (before start codon) and 3' end (after stop codon)  
A) i, ii, iii are correct B) i, ii, iii and iv are correct  
C) i, iii, iv are correct D) i, iii are correct
144. Initiator tRNA binds with

- A) AUG codon of mRNA
  - B) at initiation of protein synthesis
  - C) ATG codon of dsDNA
  - D) A and B both
145. Choose the correct about elongation of translation-
- A) Complexes composed of an amino acid linked to tRNA, sequentially bind to appropriate codon in mRNA by forming complementary base pairs with the tRNA anticodon
  - B) The ribosome moves from codon to codon along the mRNA in (3' → 5').
  - C) Complexes composed of an amino acid linked to tRNA, sequentially bind to appropriate anticodon in mRNA by forming complementary base pair with tRNA codon.
  - D) A and B both
146. Termination of translation complex is done when-
- A) Release factor binds with stop codon (AUG)
  - B) Release factor binds with UGA like codon
  - C) Complete translation of DNA including UTR occurs in eukaryotes
  - D) B and C both

## 6.8 REGULATION OF GENE EXPRESSION

### BOTANY

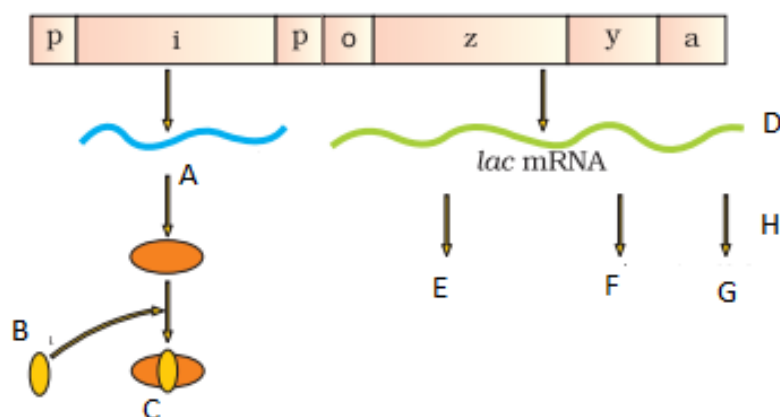
147. Gene regulation is eukaryote exerted at-
- A) Formation of primary transcript
  - B) Transport of mRNA from nucleus to cytoplasm
  - C) A and B both
  - D) Regulation of splicing of tRNA
148.  $\beta$ -galactosidase is used to catalyze the hydrosis of
- A) Lactose into galactose and glucose
  - B) Lactose into fructose & glucose
  - C) Lactose into fructose & fructose
  - D) None of these
149. E.coli do not have lactose around them to utilized for energy source, they would-
- A) No longer require the synthesis of enzyme  $\alpha$ -galactosidase
  - B) Synthesized enzyme  $\beta$ -galactosidase
  - C) Die due to lack of carbon source and energy source
  - D) None of these
150. In prokaryote, predominant site for control of gene expression is-
- A) Control of rate of transcriptional initiation
  - B) Control of rate of translational
  - C) Control of rate of transcriptional elongation
  - D) B and C both
151. Given below are statement. Choose the incorrect statement.
- A) The development and differentiation of embryo into adult organisms are result of coordinated regulation of expression of several sets of genes.
  - B) Regulatory proteins act positively in activator.
  - C) In a transcriptional unit the activity of RNA polymerase at a given promoter is in turn regulated by interaction with accessory protein.
  - D) None of these
152. Operator-
- A) Region adjacent to sequence by which repressor mRNA formed
  - B) Bind with repressor protein
  - C) Bind with inducer
  - D) A and B both

153. Each operon has -  
 A) Same operator and same repressor  
 B) Same operator but specific repressor  
 C) Specific operator but same repressor  
 D) Specific operator and specific repressor

### 6.8.1 THE LAC OPERON

154. Lac operon was studied first by-  
 A) Francois Jacob  
 B) Jacque Monod  
 C) Geneticist and Biochemist  
 D) None of these
155. Lac operon is/are-  
 A) Monocistronic structural gene is regulated by a common promoter & regulators genes.  
 B) Polycistronic structural gene is regulated by a common promoter & regulatory genes.  
 C) Consist of one regulatory gene, monocistronic structural gene having five gene along with promoter & operator.  
 D) A and C both
156. Regulatory gene of lac-operon is-  
 A) p-gene      B) i-gene      C) o-gene      D) z-gene
157. i in i-gene stand for-  
 A) inducer      B) inhibitor      C) A and B both      D) Inactive repressor
158. Match Column-I & Column-II.
- | Column-I(Gene) |  | Column-II(Product)  |  |
|----------------|--|---------------------|--|
| (a) Z-gene     |  | (i) Repressor mRNA  |  |
| (b) a-gene     |  | (ii) $\beta$ -gal   |  |
| (c) Y-gene     |  | (iii) Permease      |  |
| (d) i-gene     |  | (iv) Transacetylase |  |
- | a        | b     | c     | d     |
|----------|-------|-------|-------|
| A) (iii) | (ii)  | (iv)  | (i)   |
| B) (iv)  | (iii) | (ii)  | (i)   |
| C) (i)   | (ii)  | (iv)  | (iii) |
| D) ii)   | (iv)  | (iii) | (i)   |
159. The monomeric product of lactose is chiefly hydrolyzed by-  
 A) i-gene      B) z-gene      C) a-gene      D) y-gene.
160. Lac in lac-operon is for  
 A) Monosaccharide      B) Disaccharide  
 C) Polysaccharide      D) Insect
161. In absence of preferred carbon source, if lactose is provided in growth medium of bacteria, the lactose is transported into cell through by action of product formed by-  
 A) i-gene      B) z-gene      C) a-gene      D) y-gene
162. Allolactose is-  
 A) Inducer of lac-operon  
 B) Inductive repressor  
 C) Form of lactose that bind with product of repressor mRNA and inhibit transcription of structural gene  
 D) All of these
163. Lac operon is-  
 A) Negative regulation operon  
 B) Positive regulation operon  
 C) A and B both

- D) None of these
164. Inducer of lac-operon is-  
 A) Glucose                      B) Galactose                      C) Lactose                      D) Fructose
- 165.



- A) The given diagram is in presence of lactose  
 B) The given diagram is in absence of lactose  
 C) The given diagram is of gene off  
 D) D and H is same process
- 6.9 HUMAN GENOME PROJECT (HGP)**
166. HGP was launched in-  
 A) 1980                      B) 1970                      C) 1990                      D) 2000
167. HGP was called a-  
 A) Minor project                      B) Hexagonal project  
 C) Mega project                      D) None of these
168. Human genome has approx. \_\_\_\_\_ bp.  
 A)  $3 \times 10^9$                       B)  $3 \times 10^6$                       C)  $6 \times 10^9$                       D)  $6 \times 10^6$
169. If cost of sequencing required is US \$ 3 per bp, then total cost of sequencing human genome as per 8-3 will be:  
 A) US \$ 18 billion                      B) US \$ 9 billion                      C) US \$ 18 million                      D) US \$ 9 million

### GOALS OF HGP

170. There were approx. \_\_\_\_\_ genes in human DNA, as per the goals of HGP  
 A) 20,000 - 25,000                      B) 40,000 - 45,000                      C) 10,000 - 15,000                      D) 50,000 - 60,000
171. HGP was a \_\_\_\_\_ year project  
 A) 15                      B) 12                      C) 13                      D) 14
172. HGP was coordination by-  
 A) US department of engineering & national institute of health  
 B) US department of engineering and national institute of biotechnology  
 C) US department of energy and national institute of biotechnology  
 D) US department energy and National Institute of Health
173. The \_\_\_\_\_ of U.K was a major partner of HGP  
 A) Wellcome trust                      B) Health trust  
 C) Social trust                      D) Welcome trust
174. Project was completed in-  
 A) 2005                      B) 2004                      C) 2003                      D) 2002
175. Additional contributes to HGP was-  
 A) Japan                      B) China                      C) Germany                      D) All of these
176. Caenorhabditis elegans is a-  
 A) Fungi                      B) Nematode                      C) Bacteria                      D) Virus
177. Caenorhabditis elegans is-

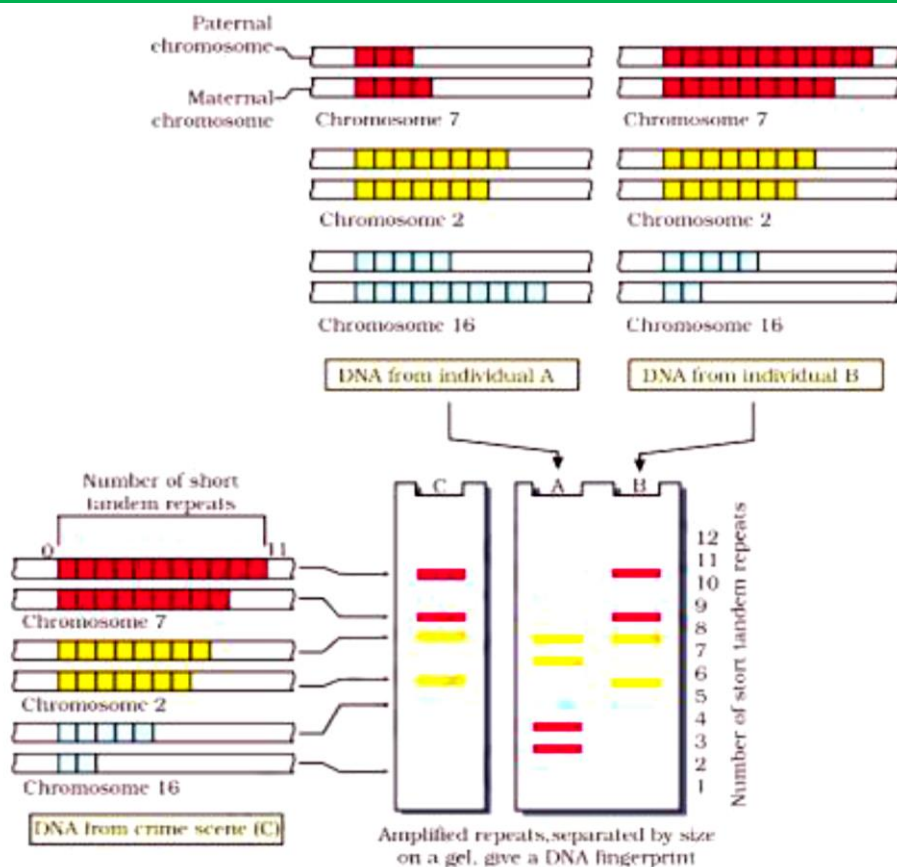


- A) Free living , non-pathogenic  
 B) Parasitic , pathogenic  
 C) Free living , pathogenic  
 D) Parasitic , non-pathogenic
178. Methods / approaches of HGP include-  
 A) Excess sequence tags  
 B) Expressed sequence tags  
 C) Exercise sequence tags  
 D) Exerted sequence tags
179. Sequence annotations refer to-  
 A) Identifying all genes expressed as RNA and then sequencing then  
 B) Sequencing the whole set of genome and then assigning different regions with functions  
 C) Identifying and sequencing the genome simultaneously  
 D) More than one option is correct
180. For sequencing, the DNA is-  
 A) Partially extracted from cell  
 B) Totally isolated from cell  
 C) Not needed to isolated from cell  
 D) None of these
181. The DNA for sequencing is converted to fragments of small size. The fragments are made-  
 A) On a pre - decided basis  
 B) On a pre - defined basis  
 C) Randomly  
 D) Depending upon organism
182. The step in DNA sequencing after fragmentation of DNA is-  
 A) Cloning in host using vectors  
 B) Cloning in vectors using host  
 C) Amplification of DNA fragments  
 D) More than one option
183. Commonly used hosts for DNA cloning include-  
 A) Bacteria    B) BAC    C) YAC    D) Both A and C
184. BAC stands for-  
 A) Bacterial artificial colour  
 B) Binominal artificial characterization  
 C) Bacterial artificial chromosome  
 D) Bacterial articular chromosome
185. Fragments were sequenced using automated DNA sequence that worked on principle of a method developed by-  
 A) Erwin Chargaff                      B) Marshal Nirenberg  
 C) Frederick Sanger                    D) George Gamow
186. Method for determination of amines acid sequence in protein was developed by-  
 A) Erwin Chargaff                      B) Marshal Nirenberg  
 C) Frederick Sanger                    D) George Gamow
187. The last of the 24 human chromosomes to be sequenced was-  
 A) Chromosome 1                      B) Chromosome X  
 C) Chromosome 22                    D) Chromosome Y
- 6.9.1 SALIENT FEATURES OF HUMAN GENOME**
188. According to HGP, human genome contains-  
 A) ~ 3000 million bp                  B) ~ 6000 million bp  
 C) ~ 9000 million bp                  D) ~ 1000 million bp

189. Dystrophin was found to be-
- A) Largest known human gene with 2.4 million bases
  - B) Smallest known human gene with 2.4 million bases
  - C) Largest known human gene with 4.8 million bases
  - D) Smallest known human gene with 4.8 million bases
190. Which chromosome was found to have most genes-
- A) Chr 22
  - B) Chr 1
  - C) Chr 5
  - D) Chr Y
191. Which chromosome was found to have fewest genes-
- A) Chr X
  - B) Chr Y
  - C) Chr 1
  - D) Chr 5

### 6.10 DNA FINGER PRINTING

192. The DNA sequence in which small stretch of DNA is repeated many times is called-
- A) SNP
  - B) Repetitive DNA
  - C) Polymorphic DNA
  - D) More than one option
193. Satellite DNA classified into different categories like micro - satellite , mini -satellite , etc based on-
- A) Length of segment
  - B) Number of repetitive
  - C) Base composition
  - D) All of these
194. Polymorphism arises due to-
- A) Mutation – inheritable
  - B) Stability of genetic material
  - C) Mutation - non-heritable
  - D) All of these
195. DNA polymorphism is observed more in-
- A) non-coding DNA sequence as its mutation affects reproduction
  - B) coding DNA sequence as its mutation affects reproduction
  - C) non-coding DNA sequence as its mutation may not affect reproduction ability
  - D) Coding DNA sequence as its mutation may not affect reproduction ability
196. Technique of DNA fingerprinting was initially developed by-
- A) James Watson
  - B) Jansley
  - C) Alec Jeffreys
  - D) Maheshwari
197. VNTR stands for-
- A) Various number of Tendon Repeats
  - B) Variable Number of Tendon Repeats
  - C) Various Number of Tandem Repeats
  - D) Variable Number of Tandem Repeats
198. VNTR belongs to-
- A) Micro-satellite
  - B) Macro-satellite
  - C) Mini-satellite
  - D) All of these
- 199.

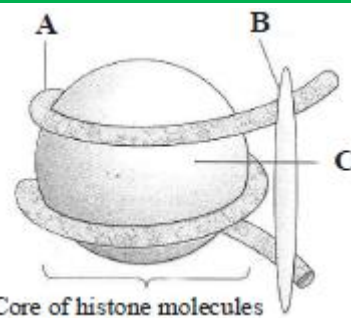


In the given figure if 'C' is the DNA collected from crime site and 'A' & 'B' are samples from suspects, than who is the criminal?

- A) B      B) A      C) Both A and B      D) None of these

## NEET PREVIOUS YEARS QUESTIONS

- The experimental proof for semi-conservative replication of DNA was first shown in a : [2018]  
(a) Fungus      (b) Bacterium      (c) Virus      (d) Plant
- Select the correct match [2018]  
(a) Alec Jeffreys      - *Streptococcus pneumoniae*  
(b) Alfred Hershey and Martha Chase      - TMV  
(c) Francois Jacob and Jacques Monod      - Lac operon  
(d) Matthew Meselson and F. Stahl      - *Pisum sativum*
- Many ribosomes may associate with a single mRNA to form multiple copies of a polypeptide simultaneously. Such strings of ribosomes are termed as : [2018]  
(a) Polysome      (b) Polyhedral bodies      (c) Nucleosome      (d) Plastidome
- AGGTATCGCAT is a sequence from the coding strand of a gene. What will be the corresponding sequence of the transcribed mRNA? [2018]  
(a) AGGUAUCGCAU      (b) UGGTUTCGCAT      (c) UCCAUAAGCGUA      (d) ACCUAUGCGAU
- All of the following are part of an operon except : [2018]  
(a) An operator      (b) Structural genes      (c) A promoter      (d) An enhancer
- The given figure shows the structure of nucleosome with their parts labelled as A, B & C. Identify A, B and C. [2017]



- (a) A – DNA; B – H1 histone; C – Histone octamer (b) A – H1 histone; B – DNA; C – Histone octamer  
 (c) A – Histone octamer; B – RNA; C – H1 histone (d) A – RNA; B – H1 histone; C – Histone octamer
7. Match the codons given in column I with their respective amino acids given in column II and choose the correct answer. [2017]

Column -I		Column -II	
(Codons)		(Amino acids)	
A	UUU	I.	Serine
B	GGG	II.	Methionine
C	UCU	III.	Phenylalanine
D	CCC	IV.	Glycine
E	AUG	V.	Proline

- (a) A – III; B – IV; C – I; D – V; E – II (b) A – III; B – I; C – IV; D – V; E – II  
 (c) A – III; B – IV; C – V; D – I; E – II (d) A – II; B – IV; C – I; D – V; E – III
8. The final proof for DNA as the genetic material came from the experiments of : [2017]  
 (a) Hershey and Chase (b) Avery, Mcleod and McCarty  
 (c) Hargobind Khorana (d) Griffith
9. DNA fragments are : [2017]  
 (a) Negatively charged (b) Neutral  
 (c) Either positively or negatively charged depending on their size  
 (d) Positively charged
10. Which of the following RNAs should be most abundant in animal cell? [2017]  
 (a) t-RNA (b) m-RNA (c) mi-RNA (d) r-RNA
11. The association of histone H<sub>1</sub> with a nucleosome indicates [2017]  
 (a) DNA replication is occurring. (b) the DNA is condensed into a chromatin fibre.  
 (c) the DNA double helix is exposed. (d) transcription is occurring.
12. If there are 999 bases in an RNA that codes for a protein with 333 amino acids, and the base at position 901 is deleted such that the length of the RNA becomes 998 bases, how many codons will be altered? [2017]  
 (a) 11 (b) 33 (c) 333 (d) 1
13. During DNA replication, Okazaki fragments are used to elongate [2017]  
 (a) the lagging strand towards replication fork. (b) the leading strand away from replication fork.  
 (c) the lagging strand away from the replication fork. (d) the leading strand towards replication fork.
14. Spliceosomes are not found in cells of : [2017]  
 (a) Fungi (b) Animals (c) Bacteria (d) Plants
15. Which of the following is required as inducer(s) for the expression of Lac operon? [2016]  
 (a) Glucose (b) Galactose (c) Lactose (d) Lactose and galactose
16. Which of the following is not required for any of the techniques of DNA fingerprinting available at present? [2016]  
 (a) Polymerase chain reaction (b) Zinc finger analysis  
 (c) Restriction enzymes (d) DNA-DNA hybridisation
17. Which one of the following is the starter codon? [2016]  
 (a) AUG (b) UGA (c) UAA (d) UAG



18. A complex of ribosomes attached to a single strand of RNA is known as : [2016]  
 (a) Polysome (b) Polymer (c) Polypeptide (d) Okazaki fragment
19. There are three genes a, b, c. Percentage of crossing over between a and b is 20%, b and c is 28% and a and c is 8%. What is the sequence of genes on chromosome? [2015]  
 (a) b, a, c (b) a, b, c (c) a, c, b (d) None of these
20. Which one of the following is not applicable to RNA? [2015]  
 (a) 5' phosphoryl and 3' hydroxyl ends (b) Heterocyclic nitrogenous bases  
 (c) Chargaff's rule (d) Watson and Crick
21. In sea urchin DNA, which is double stranded, 17% of the bases were shown to be cytosine. The percentages of the other three bases expected to be present in this DNA are: [2015]  
 (a) G-17%, A-16.5%, T-32.5% (b) G-17%, A-33%, T-33%  
 (c) G-8.5%, A-50%, T-24.5% (d) G-34%, A-24.5%, T-24.5%
22. The movement of a gene from one linkage group to another is called \_\_\_\_\_. [2015]  
 (a) duplication (b) translocation (c) crossing over (d) inversion
23. Gene regulation governing lactose operon of *E. coli* that involves the lac I gene product is : [2015]  
 (a) negative and inducible because repressor protein prevents transcription.  
 (b) negative and repressible because repressor protein prevents transcription.  
 (c) feedback inhibition because excess of  $\beta$ -galactosidase can switch off transcription.  
 (d) positive and inducible because it can be induced by lactose.
24. Satellite DNA is important because it : [2015]  
 (a) shows high degree of polymorphism in population and also the same degree of polymorphism in an individual, which is heritable from parents to children.  
 (b) does not code for proteins and is same in all members of the population.  
 (c) codes for enzymes needed for DNA replication.  
 (d) codes for proteins needed in cell cycle.
25. Select the correct option. [2014]

	Direction of RNA synthesis	Direction of reading of the template DNA strand
(a)	5'—3'	3'—5'
(b)	3'—5'	5'—3'
(c)	5'—3'	5'—3'
(d)	3'—5'	3'—5'

- (a) 5'—3' 3'—5' (b) 3'—5' 5'—3' (c) 5'—3' 5'—3' (d) 3'—5' 3'—5'
26. Which one of the following represents a palindromic sequence in DNA? [2014]  
 (a) 5' - GAATTC - 3'  
       3' - CTTAAG - 5'  
 (b) 5' - CCAATG - 3'  
       3' - GAATCC - 5'  
 (c) 5' - CATTAG - 3'  
       3' - GATAAC - 5'  
 (d) 5' - GATACC - 3'
27. Transformation was discovered by : [2014]  
 (a) Meselson and Stahl (b) Hershey and Chase (c) Griffith (d) Watson and Crick
28. Which one of the following is wrongly matched? [2014]  
 (a) Transcription – Writing information from DNA to tRNA.  
 (b) Translation – Using information in mRNA to make protein.  
 (c) Repressor protein – Binds to operator to stop enzyme synthesis.  
 (d) Operon – Structural genes, operator and promoter.
29. Commonly used vectors for human genome sequencing are: [2014]  
 (a) T-DNA (b) BAC and YAC (c) Expression vectors (d) T/A cloning vectors
30. Purines found both in DNA and RNA are :- [NEET-2019]  
 (1) Adenine and thymine (2) Adenine and guanine  
 (3) Guanine and cytosine (4) Cytosine and thymine
31. Under which of the following conditions will there be no change in the reading frame of following mRNA ? [NEET-2019]  
 5'AACAGCGGUGCUAUU3'

- (1) Insertion of G at 5th position (2) Deletion of G from 5th position  
(3) Insertion of A and G at 4th and 5th positions respectively  
(4) Deletion of GGU from 7th, 8th and 9th positions
32. Which of the following features of genetic code does allow bacteria to produce human insulin by recombinant DNA technology? [NEET-2019]  
(1) Genetic code is not ambiguous (2) Genetic code is redundant  
(3) Genetic code is nearly universal (4) Genetic code is specific
33. Expressed Sequence Tags (ESTs) refers to :- [NEET-2019]  
(1) Genes expressed as RNA (2) Polypeptide expression  
(3) DNA polymorphism (4) Novel DNA sequences
34. Match the following genes of the Lac operon with their respective products :- [NEET-2019]  
(a) i gene (i)  $\beta$ -galactosidase (b) z gene (ii) Permease  
(c) a gene (iii) Repressor (d) y gene (iv) Transacetylase  
Select the correct option.  
(a) (b) (c) (d) (a) (b) (c) (d) (a) (b) (c) (d) (a) (b) (c) (d)  
(1) (i) (iii) (ii) (iv) (2) (iii) (i) (ii) (iv) (3) (iii) (i) (iv) (ii) (4) (iii) (iv) (i) (ii)
35. What will be the sequence of mRNA produced by the following stretch of DNA? [NEET-2019 ODISSA]  
3'ATGCATGCATGCATG5' TEMPLATE STRAND  
5' TACGTACGTACGTAC3' CODING STRAND  
(1) 3'AUGCAUGCAUGCAUG5' (2) 5'UACGUACGUACGUAC 3'  
(3) 3' UACGUACGUACGUAC 5' (4) 5' AUGCAUGCAUGCAUG 3'
36. Match the following RNA polymerase with their transcribed products : [NEET-2019 ODISSA]  
(a) RNA polymerase I (i) tRNA  
(b) RNA polymerase II (ii) rRNA  
(c) RNA polymerase III (iii) hnRNA  
Select the correct option from the following :  
(1) a-i, b-iii, c-ii (2) a-i, b-ii, c-iii (3) a-ii, b-iii, c-i (4) a-iii, b-ii, c-i
37. From the following, identify the correct combination of salient features of Genetic Code :- [NEET-2019 ODISSA]  
(1) Universal, Non-ambiguous, Overlapping (2) Degenerate, Overlapping, Commaless  
(3) Universal, Ambiguous, Degenerate (4) Degenerate, Non-overlapping, Non-ambiguous
38. Which scientist experimentally proved that DNA is the sole genetic material in bacteriophage ? [NEET-2019 ODISSA]  
(1) Beadle and Tatum (2) Messelson and Stahl (3) Hershey and Chase (4) Jacob and Monod
39. In the process of transcription in Eukaryotes, the RNA polymerase I transcribes [NEET-2019 ODISSA]  
(1) mRNA with additional processing, capping and tailing (2) tRNA, 5 S rRNA and snRNAs  
(3) rRNAs. 28 S, 18 S and 5.8 S (4) Precursor of mRNA, hnRNA
40. What initiation and termination factors are involved in transcription in Eukaryotes? [NEET-2019 ODISSA]  
(1) s and r, respectively (2) a and b, respectively  
(3) b and g, respectively (4) a and s, respectively
41. The term 'Nuclein' for the genetic material was used by : [NEET-2020 COVID]  
(1) Franklin (2) Meischer (3) Chargaff (4) Mendel
42. In the polynucleotide chain of DNA, a nitrogenous base is linked to the -OH of: [NEET-2020 COVID]  
(1) 2'C pentose sugar (2) 3'C pentose sugar (3) 5'C pentose sugar (4) 1'C pentose sugar
43. E.coli has only  $4.6 \times 10^6$  base pairs and completes the process of replication within 18 minutes; then the average rate of polymerisation is approximately- [NEET-2020 COVID]  
(1) 2000 base pairs/second (2) 3000 base pairs/second  
(3) 4000 base pairs/second (4) 1000 base pairs/second
44. Which is the basis of genetic mapping of human genome as well as DNA finger printing? [NEET-2020 COVID]  
(1) Polymorphism in DNA sequence (2) Single nucleotide polymorphism  
(3) Polymorphism in hnRNA sequence (4) Polymorphism in RNA sequence

45. Name the enzyme that facilitates opening of DNA helix during transcription [NEET-2020]  
 1) RNA polymerase 2) DNA ligase 3) DNA helicase 4) DNA polymerase
46. The first phase of translation is: [NEET-2020]  
 1) Recognition of an anti-codon 2) Binding of mRNA to ribosome  
 3) Recognition of DNA molecule 4) Aminoacylation of tRNA
47. If the distance between two consecutive base pairs is 0.34 nm and the total number of base pairs of a DNA double helix in a typical mammalian cell is  $6.6 \times 10^9$  bp, then the length of the DNA is approximately [NEET-2020]  
 1) 2.7 meters 2) 2.0 meters 3) 2.5 meters 4) 2.2 meters
48. Complete the flow chart on central dogma [NEET-2021]  
 (a)  $\text{DNA} \xrightarrow{(b)} \text{mRNA} \xrightarrow{(c)} (d)$   
 1) (a)-Translation; (b)-Replication; (c)-Transcription;(d)-Transduction  
 2) (a)- Replication;(b)- Transcription;(c)- Translation;(d)-Protein  
 3) (a)-Transduction; (b)-Transcription (c)-Transduction;(D) –Protein  
 4) a) Replication, b) Transcription, c) Transduction; D)-protein
49. Identify the correct statement [NEET-2021]  
 1) RNA polymerase binds with Rho factor to terminate the process of transcription in bacteria.  
 2) The coding strand in a transcription unit is copied to an mRNA  
 3) Split gene arrangement is characteristic of prokaryotes  
 4) In capping, methyl guanosine triphosphate is added to the 3' end of hnRNA
50. What is the role of RNA polymerase III in the process of transcription in eukaryotes? [NEET2021]  
 1) Transcribes tRNA, 5s rRNA and snRNA 2) Transcribes precursor of mRNA  
 3) Transcribes only snRNAs 4) Transcribes rRNAs (28S, 18S and 5.8S)
51. Which is the "Only enzyme" that has "capability" to catalyse initiation, Elongation and Termination in the process of transcription in prokaryotes ? [NEET-2021]  
 1. DNA dependent RNA polymerase 2. DNA Ligase  
 3. DNase 4. DNA dependent DNA polymerase
52. A specific recognition sequence identified by endonucleases to make cuts at specific positions within the DNA is [NEET-2021]  
 1) Okazaki sequences 2) Palindromic Nucleotide sequences  
 3) Poly(A) tail sequences 4) Degenerate primer sequence
53. Which of the following RNAs is not required for the synthesis of protein? [NEET-2021]  
 1) tRNA 2) rRNA 3) siRNA 4) mRNA
54. Statement-I: The codon 'AUG codes for methionine and phenylalanine. [NEET-2021]  
 Statement-II: 'AAA' and 'AAG' both codons code for the amino acid lysine.  
 In the light of the above statements, choose the correct answer from the options given below  
 1) Both Statement I and Statement II are false  
 2) Statement I is correct but Statement II is false  
 3) Statement I is incorrect but Statement II is true  
 4) Both Statement I and Statement II are true
55. Which one of the following statements about Histones is wrong? [NEET-2020]  
 1) The pH of histones is slightly acidic.  
 2) Histones are rich in amino acids – Lysine and Arginine.  
 3) Histones carry positive charge in the side chain  
 4) Histone are organized to form a unit of 8 molecules.
56. DNA fingerprinting involves identifying differences in some specific regions in DNA sequence, called as: [NEET-2021]  
 1) Repetitive DNA 2) Single nucleotides 3) Polymorphic DNA 4) Satellite DNA
57. In an *E.coli* strain *i* gene gets mutated and its product cannot bind the inducer molecule. If growth medium is provided with lactose, what will be the outcome? [NEET-2022]  
 1) Only *z* gene will get transcribed

- 2) z, y, a genes will be transcribed  
 3) z, y, a genes will not be translated  
 4) RNA polymerase will bind the promoter region
58. If the length of a DNA molecule is 1.1 metres, what will be the approximate number of base pairs? [NEET-2022]  
 1)  $3.3 \times 10^9$  bp      2)  $6.6 \times 10^9$  bp      3)  $3.3 \times 10^6$  bp      4)  $6.6 \times 10^6$  bp
59. Ten *E.coli* cells with  $^{15}\text{N}$  - dsDNA are incubated in medium containing  $^{14}\text{N}$  nucleotide. After 60 minutes, how many *E.coli* cells will have DNA totally free from  $^{15}\text{N}$ ? [NEET-2022]  
 1) 20 cells      2) 40 cells      3) 60 cells      4) 80 cells

## NCERT LINE BY LINE QUESTIONS – ANSWERS

1) D	2) C	3) D	4) A	5) B	6) B	7) B	8) D	9) D	10) A
11) A	12) D	13) C	14) B	15) B	16) C	17) C	18) A	19) C	20) B
21) A	22) C	23) B	24) C	25) C	26) B	27) A	28) B	29) A	30) D
31) C	32) A	33) B	34) A	35) D	36) D	37) D	38) C	39) D	40) C
41) A	42) D	43) C	44) A	45) D	46) A	47) D	48) A	49) A	50) C
51) B	52) A	53) D	54) A	55) D	56) B	57) C	58) B	59) C	60) D
61) C	62) A	63) B	64) A	65) C	66) A	67) C	68) B	69) B	70) C
71) A	72) C	73) A	74) C	75) A	76) A	77) B	78) C	79) C	80) C
81) A	82) B	83) C	84) A	85) C	86) A	87) C	88) B	89) B	90) C
91) D	92) C	93) B	94) D	95) A	96) A	97) B	98) C	99) A	100) A
101) C	102) D	103) B	104) D	105) B	106) A	107) B	108) A	109) A	110) B
111) A	112) A	113) A	114) A	115) B	116) B	117) A	118) B	119) A	120) A
121) B	122) D	123) D	124) A	125) B	126) B	127) A	128) B	129) D	130) C
131) A	132) D	133) C	134) C	135) D	136) A	137) A	138) A	139) B	140) D
141) B	142) A	143) D	144) D	145) A	146) B	147) C	148) A	149) D	150) A
151) D	152) B	153) D	154) C	155) B	156) B	157) B	158) D	159) B	160) B
161) D	162) A	163) C	164) C	165) A	166) C	167) C	168) A	169) B	170) A
171) C	172) D	173) A	174) C	175) D	176) B	177) A	178) B	179) B	180) B
181) C	182) D	183) A	184) C	185) C	186) C	187) A	188) A	189) A	190) B
191) B	192) B	193) D	194) A	195) C	196) C	197) D	198) C	199) A	

## NEET PREVIOUS YEARS QUESTIONS-ANSWERS

- 1 (b) 2 (c) 3 (a) 4 (a) 5 (d) 6 (a) 7 (a) 8 (a) 9 (a) 10 (d)  
 11 (b) 12 (b) 13 (c) 14 (c) 15 (c) 16 (b) 17 (a) 18 (a) 19 (a) 20 (c)  
 21 (b) 22 (b) 23 (a) 24 (a) 25 (a) 26 (a) 27 (c) 28 (a) 29 (b) 30 (2)  
 31 (4) 32 (3) 33 (1) 34 (3) 35 (2) 36 (3) 37 (4) 38 (3) 39 (3) 40 (1)  
 41 (2) 42 (4) 43 (1) 44 (1) 45 (1) 46 (2) 47 (4) 48 (2) 49 (1) 50 (1)  
 51 (1) 52 (2) 53 (3) 54 (3) 55 (1) 56 (1) 57 (4) 58 (2) 59 (1)

## NEET PREVIOUS YEARS QUESTIONS-EXPLANATIONS

1. (b) Semi-conservative DNA replication was first shown in bacterium *Escherichia coli* by Matthew Meselson and Franklin Stahl.
2. (c)
3. (a) A polyribosome (or polysome) is a complex of an mRNA molecule and two or more ribosomes that act to translate mRNA instructions into polypeptides.
4. (a) Coding strand and mRNA have the similar nucleotide sequence except, Thymine (T) is replaced by Uracil (U) in mRNA.
5. (d) Unlike eukaryotes, in prokaryotes the genes are organised into operon. Operon is a co-ordinated group of genes which are all transcribed together & regulate a metabolic pathway as a unit.
6. (a) 7. (a)
8. (a) Hershey and Chase proved that DNA is genetic material. They used bacteriophage for their experiment.
9. (a) DNA fragments are negatively charged because of presence of phosphate group.

10. (d) Ribosomal RNA (rRNA) is most abundant in animal cell. It constitutes about 80% of total RNA of the cell.
11. (b) The association of H1 protein indicates the complete formation of nucleosome which requires DNA condensation. Therefore DNA is in condensed form.
12. (b) If deletion happens at 901st position than the remaining 98 bases specifying for 33 codons of amino acids will be altered.
13. (c)
14. (c) In eukaryotes spliceosomes are used in removal of introns during post-transcriptional processing of hnRNA. They are absent in prokaryotes.
15. (c)
16. (b) Zinc-finger analysis is used for protein analysis. The zinc finger proteins are a super family of proteins involved in numerous activities of plant growth and development.
17. (a) The start codon is the first codon of a messenger RNA (mRNA) transcript translated by a ribosome. The start codon always codes for methionine in eukaryotes and a modified Met (fMet) in prokaryotes. The most common start codon is AUG.
18. (a) A polysome or polyribosome is a complex of an mRNA molecule and two or more ribosomes, which is formed during the active translation process. They were initially named as ergosomes in 1963. However, further research by Jonathan Warner and Alex Rich characterised polysome.
19. (a)
20. (c) Chargaff's rule is not applicable to RNA.
21. (b) 22. (b)
23. (a) Lac operon under control of repressor shows a negative regulation. Operon has inducible nature.
24. (a)
25. (a) Synthesis of RNA exhibits several features that are synonymous with DNA replication. RNA synthesis requires accurate and efficient initiation, elongation proceeds in the 5'–3' direction (*i.e.* the polymerase moves along the template strand of DNA in the 3'–5' direction), and RNA synthesis requires distinct and accurate termination. Transcription exhibits several features that are distinct from replication.
26. (a) 27. (c) 28. (a)
29. (b) Human genome sequencing is a process that determines the complete DNA sequence of an organism's genome at a single time. This requires sequencing of an organism's chromosomal DNA as well as DNA contained in the mitochondria and, for plants, in the chloroplast. Commonly used vectors for human genome sequencing are BAC (Bacterial artificial chromosomes) and YAC (Yeast artificial chromosomes).
45. Opening of DNA helix is facilitated by RNA polymerase. Opening of DNA is performed by DNA helicase
46. In the first step of RNA translation mRNA binds to ribosomes
47.  $6.6 \times 10^9 \text{ bp} \times 0.34 \text{ nm} = 2.2 \text{ meters}$
48. DNA—DNA-----Replication  
DNA---RNA---- Transcription  
RNA—Protein ---- Translation  
d—protein
49. • Split gene arrangement is characteristic of eukaryotes.
- In capping 5-methyl guanosine triphosphate is added at 5' end of hnRNA.
- At 3' end poly-A tail is added.
- The non coding or template strand is copied to an mRNA. RNA polymerase associate with  $\rho$  factor (Rho factor) and it alters the specificity of the RNA polymerase to terminate the processes.
50. • RNA polymerase III transcribes tRNA, ScRNA, 5S rRNA and SnRNA.  
• RNA polymerase I transcribes 5.8S, 18S and 28S rRNA.  
• RNA polymerase II transcribes hnRNA which is precursor of mRNA
- 51 The enzyme capable of Initiation , elongation and termination in the process of transcription in prokaryotes  
DNA dependent RNA polymerase

52. Palindromic Nucleotide sequences are specific recognition sequence
53. Short interfering RNA or silencing RNA is not involved in protein synthesis.
54. The codon 'AUG' codes for methionine and 'UUU' codes for phenylalanine.
55. \* Histones are rich in basic amino acids residue lysine and arginine with charged side chain.  
\* There are five types of histone proteins i.e., H1, H2A, H2B, H3 and H4. Four of them occur in pairs to produce a unit of 8 molecules (histone octamer)  
\* The pH of histones is basic.
56. Repetitive DNA
57. *z*, *y*, *a* genes will be transcribed normally as *i* gene gets mutated and its product cannot bind the inducer molecule
58. Length of DNA is 2.2m i.e.,  $6.6 \times 10^9 bp$   
Therefore 1.1m is  $3.3 \times 10^9 bp$
59. 3 cycles of division occurs in 60 minutes forming a total of 80 *E.coli* cells. 20/80 cells contains medium DNA and 60/80 cells contain light DNA



